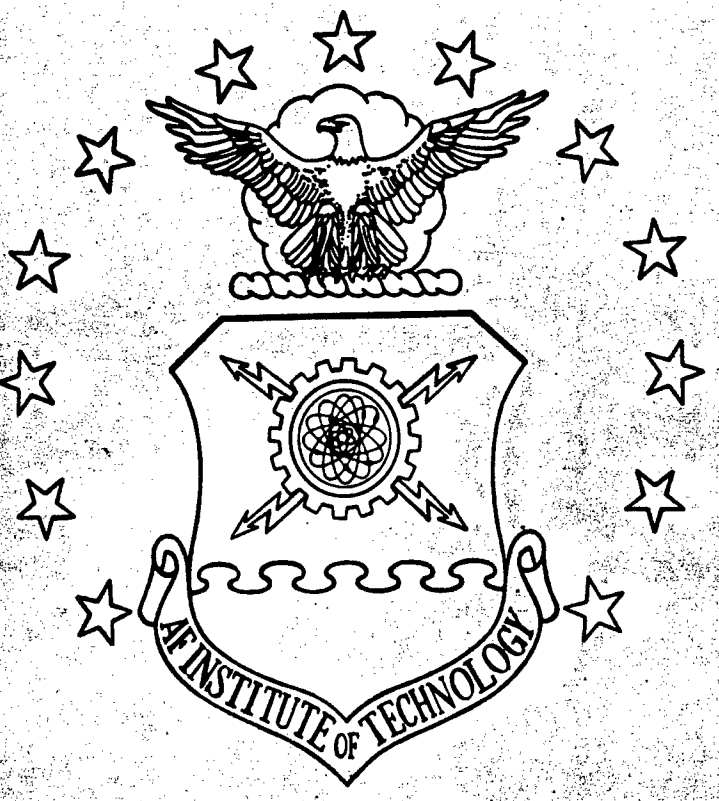

MEASURING COMPUTER USAGE BY AIR FORCE CONTRACTING PERSONNEL AS IT RELATES TO COMPUTER TRAINING

THESIS

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AFIT/GCM/LAR/96S-8

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THESIS

Presented to the Faculty of the School of Logistics and
Acquisition Management of the
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In Partial Fulfillment of the
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Master of Science in Logistics Management

John H. Van Huffel, BBA
1st Lt, USAF

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"Thou shalt not sit

With statisticians nor commit

A social science." -W. H. Auden 1907-1973

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John Van Huffel

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Abstract

We know little about how Air Force personnel use the computer resources with which they have been provided, though current plans call for spending over $75M on computer resources throughout the Air Force in FY 97. Research suggests that computer use relates to computer training, computer anxiety, and computer self-efficacy. Managers can take action to ensure that computers are better utilized with knowledge of how computer resources are being used, and an understanding of the effect that training, computer anxiety, and computer self-efficacy have on that usage. This study examines the use of computers by contracting personnel in the Air Force's Aeronautical Systems Center Contracting Directorate. Its purpose was to discover the amount of time employees spent using different computer programs and completing various computer tasks, and to measure their training level for each program or task. It also measured data about employees' computer anxiety and computer self-efficacy. Training was found in most instances to be related to increased computer usage, and employees in different job functions were also found to use computers to differing extents. Computer anxiety and self-efficacy were found to be related to the amount of time employees spent using computers. Time spent using computers and training amount were still significantly related, even when the effects of computer anxiety and self-efficacy were factored out of the equation.

MEASURING COMPUTER USAGE BY AIR FORCE CONTRACTING PERSONNEL AS IT RELATES TO COMPUTER TRAINING

I. Introduction

Problem Statement

We know little about how Air Force people use the computer resources with which they have been provided, though current plans call for spending over $75M on computer resources throughout the Air Force in FY 97 (IBERT, 1996). Research suggests that computer use relates to computer training, computer anxiety, and computer self-efficacy. With knowledge of how computer resources are being used, and an understanding of the effect that training, computer anxiety, and computer self-efficacy have on that usage, managers can take action to ensure that computers are better utilized. This study examines the use of computers by contracting personnel in the Air Force's Aeronautical Systems Center Contracting Directorate.

The presence of computers is ubiquitous in the Air Force. Most aspects of contracting have been automated to some degree. For example, personnel are using computers for synopsizing new requirements electronically in the Commerce Business Daily, generating requests for proposals using specialized contract-writing software, developing negotiation positions using spreadsheet programs and automated weighted guidelines software, and writing letters to contractors with a word processor to direct action. Surprisingly, there has been little research examining how this equipment is

being used to accomplish these tasks. Nor has research analyzed the impact of training on the amount of time people spend using various types of software to do their jobs.

Research Objectives

The primary objective of this study is to examine computer use in Air Force contracting units. Because computers are such a large budget item for the Air Force, it will be helpful to know how training and other factors affect use of computers by contracting personnel. Therefore, a specific objective of this study is to identify how computer training and other factors relate to the amount of time employees use computers and the number of different computer software packages being used. I expected to find differences in computer utilization between personnel who have received training and those who have not.

Other factors potentially affecting computer usage will be included in the analysis. Computer anxiety and computer self-efficacy are two constructs that can be expected to affect the amount of time employees spend working with computers. Both computer anxiety and computer self-efficacy will be analyzed against the two populations of trained and untrained personnel, and should show improvement in trained personnel. Additionally, these groups' demographics are analyzed to see if job position plays a part in computer usage.

II. Literature Review

Introduction

Management should know how much computers are being used, and to what extent other factors influence computer usage. Most aspects of the contracting profession have been automated. Other functions that can still be done manually take significantly more time to do without computers. In short, the contracting community depends on computers. However, management does not know the degree to which personnel utilize the computer resources that are available to them. We assume that the amount of time spent using computers relates positively to productivity.

There are a number of factors that affect use of computers. University studies have reported that training has a positive relationship with computer usage (Morris, 1989). Much research has also shown that computer anxiety is related to computer self-efficacy (Anderson, 1995; Bouffard-Bouchard, 1990).

This study examined the relationship between the amount of training received by Air Force contracting personnel on the amount of time they spent using computers while controlling for their computer anxiety and computer self-efficacy. Training is especially important because managers can affect the amount of training that personnel receive. Training in turn should reduce individuals' computer anxiety and computer self-efficacy. Computer anxiety and computer self-efficacy can both affect time spent using computers. Understanding how these factors interact with training is important if training affects time spent using computers. Once managers know how training,

computer anxiety, and computer self-efficacy relate to the amount of time spent using computers, they can take positive steps to control those factors that limit computer use.

Training

A research team at the Massachusetts Institute of Technology examined case studies in which large corporations implemented computer systems and interviewed consultants and experts. They concluded that the more employees knew about computers, the more they were able to use them (Morris, 1989). In a study of 157 undergraduate students, Necessary and Parish (1993) found a positive correlation between computer knowledge and computer usage. The general consensus of research on computer training is that increased training is related to increased computer usage.

Computer Anxiety

Computer anxiety has been defined as "the complex emotional reactions that are evoked in individuals who interpret computers as personally threatening" (Raub, 1982). If people find computers threatening, they may elect not to take training. On the other hand, those who have had training should exhibit lower computer anxiety One of the most tested measures of computer anxiety, the Computer Anxiety Scale (CARS), has been used by many researchers (Anderson, 1995). Use of this scale revealed a high internal consistency, with a Cronbach Alpha of .87 (Heinssen, Glass, & Knight, 1987). Miller and Rainer (1995) used this scale and found that a subset of the original questions, broken down into the two factors of high anxiety and low anxiety, was more reliable. Cronbach Alphas of .82 for high anxiety and .73 for low anxiety were

calculated, showing good reliability (Miller & Rainer, 1995).

Most research to date has been conducted on the same population--American undergraduate students (Marcoulides, Mayes, & Wiseman, 1995). However, a recent study examining university students and law enforcement officers, using the Computer Anxiety Scale (CAS), indicated that the construct of computer anxiety is stable across different groups (Marcoulides, et al., 1995). Harrison and Rainer (1992) found the 3 factors of the CAS and CARS were intercorrelated at r=.52, r=.53, and r=.76, with n=3488. Thus, the CARS measures the same constructs as the CAS, and should apply to contracting personnel. Many studies have found that computer experience consistently relates negatively to computer anxiety (Erickson, 1987; Howard & Smith, 1986; Loyd & Gressard, 1984a, 1984b; Maurer, 1983; Raub, 1982). However, recent studies have stated that experience alone will not eliminate the anxiety (Rosen, Sears & Weil, 1993). Thus it appears further examination of the relationship between anxiety and training is required.

Computer Self-Efficacy

Self-efficacy is a "generalizable belief concerning one's task relevant capabilities" (Meyer & Gellatly, 1988). Self-efficacy has been shown to have a positive effect on successful completion of tasks (Mitchell, Hopper, Daniels, George-Falvy & James, 1994; Wood & Bandura, 1989). Bandura (1986) has stated that perceived self-efficacy influences the way people behave; they avoid threatening situations when they think their coping skills are inadequate to deal with them and tend to engage in situations where they believe their skills exceed those required to complete the task.

Those who have high self-efficacy tend to complete tasks successfully more often than do those with low self-efficacy. Therefore, measuring computer self-efficacy may show some relationship to both time spent using the computer and amount of training.

In this research, one focus is on how self-efficacy affects training. I want to know if self-efficacy makes people more or less apt to take training and if people's self-efficacy during training can be affected.

An instrument developed to measure computer self-efficacy, the Computer Self-Efficacy (CSE) scale, has been tested over time through many research studies and has been found to be both valid and reliable (Murphy, Coover & Owen, 1989). Factor analysis of the scale generated a 3-factor solution that explained 92% of systematic covariation among its 32 items. The three factors were beginning computer skills, advanced computer skills and mainframe computer skills. Alpha reliabilities were .97, .96, and .92 respectively, and the studies revealed factor loadings of .52 to .91 for beginning computer skills, .35 to .99 for advanced computer skills, and .83 to .88 for mainframe computer skills (Murphy et al., 1989). Torkzadeh and Koufteros (1994) repeated the survey and found an overall alpha reliability of .96, with factor reliabilities of .94, .96, and .90. Harrison and Rainer (1992) also factor-analyzed the instrument and found loadings of .69 to .89 for beginning computer skills, .61 to .89 for advanced computer skills, and .93 to .99 for mainframe computer skills.

Eden and Aviram (1993) examined what is known as the "Galatea Effect"-- a gain in performance that is a result of a boost in self-efficacy beliefs. They believed that higher self-efficacy was related to higher job-performance; therefore raising computer self-efficacy might produce more effective employees. Due to this possibility, this variable should be measured to see how much self-efficacy contracting employees have.

There are two types of self-efficacy. Those who believe that they control the situation and those who believe the situation controls them have two different forms of

self-efficacy. In achievement situations, people tend to see their ability as either a fixed entity, or as an acquirable skill that is independent of actual ability (Elliot & Dweck, 1988). In a study that forced these views on people by inducing conceptions of ability as either a fixed entity (i.e., they couldn't possibly learn the material, or they already knew as much as they would ever be able to learn) or as an acquirable skill (i.e., they could learn the material), Martocchio (1994) found that the group that had fixed-skill inducement had no change in computer-anxiety level, while the group that had acquirable-skill inducement had a significant drop in computer anxiety. Thus type of training can affect both computer self-efficacy and computer anxiety.

Wood and Bandura (1989) found that those with an acquirable-skill schema set challenging goals, used analytic strategy well and maintained resilient self-efficacy during tasks that has difficult performance standards. This led to high organizational attainments in the test subjects. Those with a fixed-skill schema had the opposite reactions to these tasks.

Computer self-efficacy changes over time; it becomes less important to capability as skills are acquired (Mitchell et al., 1994). It has been shown that people with lower levels of experience exhibit lower computer self-efficacy, and that as people gain experience, their computer self-efficacy tends to be higher (Ackerman 1987, 1992; Ackerman & Humphreys, 1991).

Research has shown that training alone will not reduce anxiety. In a recent study, one-third of employees at a major aerospace firm were more computer-anxious after an intense workshop on computer use than before the training (Rosen et al., 1993). If people see computers as a threat, they will not use them. If they do not see training as an opportunity for gaining knowledge, they will not attend. People who have been trained will have lower computer anxiety and higher computer self-efficacy (Ackerman & Humphreys, 1991).

III. Method

Sample and Procedure

Of the 200 Supervisor surveys and 600 Contract Negotiator and Contracting Officer surveys sent out, 60 Supervisor surveys were returned (30%), and 221 Contract Negotiator and Contracting Officer surveys were returned (37%). The respondents were 80% civilian and 12% military. Ranks included 16% GS-7 through GS-11 or Lieutenants, 53% GS-12 or Captains, 18% GS-13 or Majors, 8% GS-14 or Lieutenant Colonels, and 2% GS-15 or Colonels. Of the total number of respondents, 48% were Contract Negotiators, 16% were Contracting Officers, 21% were Supervisors, and 14% did not fit into one of these categories, but were in other staff positions.

Computer experience was high: 19% had 15 or more years experience using computers, 35% had 10 to 14 years, 34% had 5 to 9 years, and 11% had 1 to 4 years. Less than 1% reported having less than a year of experience. Table 1 shows the demographics in complete detail.

Survey Instrument

The survey asked participants questions regarding their sex, age, job function, years using a computer, years in the career field of contracting, military status, and grade or rank. This information gave basic information about the participants. The

Table 1. Sample Demographics

	Frequency	Percent*
Duty Status		
Civilian	246	87.5
Military	34	12.1
Rank or Grade		
GS7 GS8 GS9 GS11 or	46	16.4
GS12 or O3	150	53.4
GS13 or O4	50	17.8
GS14 or O5	21	7.5
GS15 or O6	6	2.1
Job Position		
Buyer or Negotiator	135	48.0
PCO	46	16.4
Supervisor	60	21.4
Staff Position	38	13.5
Years using computer		
greater than 15	52	18.5
10 to 14	99	35.2
5 to 9	96	34.2
1 to 4	31	11.0
less than 1	2	0.7
Years in Contracting		
less than 1 year	9	3.2
1 to 5 years	40	14.2
6 to 10 years	50	17.8
11 to 20 years	131	46.6
21 years or longer	50	17.8
Sex		
Male	119	42.3
Female	110	39.1

* Percentages do not equal 100%, due to non-response of some participants

second variable was time spent on computers. This is the primary variable of interest, as this study examines the time personnel spend on computers. Respondents were asked to give the average amount of time spent using common software packages. The third variable was training. The main focus of this study was to see how training relates to computer usage. Eight types of computer software packages were presented, and respondents were asked to list whether they had training in each category and, if so, the quality of that training. The last variable was computer attitudes, in which computer

anxiety and computer self-efficacy were measured. Since it was thought that these variables affect time spent using computers, these measurements were used to control for their effects in examining the relationship between training and time spent. Please refer to the Appendix for a copy of the survey instrument used in this study.

Time Spent on Computer Tasks

Respondents were asked to provide the average amount of time they spent each day on certain computer programs and computer tasks, ranging from word processors to helping others with computer problems. The respondents were asked to fill in the hours and minutes in blanks provided for each question.

Computer Attitudes

Computer Anxiety. An 11-item computer anxiety scale, developed by Heinssen et al. (1987) and revised by Miller and Rainer (1985), was used. The scale, the Computer Anxiety Scale (CAS), was composed of seven questions. Four negatively-worded questions were reverse-scored to make all questions measure anxiety, with higher scores corresponding to a higher level of anxiety. A five-point Likert scale from "strongly disagree" to "strongly agree" was used in the survey.

Computer Self-efficacy. A 32-item computer self-efficacy scale, the Computer Self-Efficacy Scale (CSE), developed by Murphy et al. (1989), was used. Murphy et al. found three factors: beginning skills, advanced skills, and mainframe skills. The three questions that measured mainframe skills were dropped from the scale for this study

because the respondent population did not use mainframes on the job. The beginning skills and advanced skills were strongly correlated with $r = 0.72$, so they were treated as a single scale in this study. Two questions from the advanced skills section with the lowest loadings were dropped. Six items were added to the scale to measure self-efficacy as it related to software that the respondents were likely to use. Questions were prefaced with, "How much confidence do you have in your ability to..." and then listed specific tasks. The instrument used a five-point Likert scale ranging from 1 = "none at all" to 5 = "an extremely large amount."

Training

Eight computer programs and tasks that have been frequently utilized in contracting were listed [see table 2], and respondents were asked to answer whether they had training for each and, if so, the perceived quality of that training. The respondents could answer that they never had training or answer on a four-point Likert scale ranging from "very low quality" to "very high quality" if they had received training. Each of these programs or usages corresponded to a program or usage that was queried in the survey section on time spent using the computer, so that an analysis of training and time spent could be conducted.

Analysis

An ANOVA was conducted on each of the eight training variables: time spent using computers was the dependent variable, whether the respondent had training or not was one independent variable, and the job category of the respondent was the other

Table 2. Training Level

	Frequency	Percent
Word Processors		
Has Had Training	213	75.8
No Training	68	24.2
Spreadsheets		
Has Had Training	191	68.0
No Training	90	32.0
Slide Presentation		
Has Had Training	146	52.0
No Training	135	48.0
Email		
Has Had Training	198	70.5
No Training	83	29.5
Database		
Has Had Training	67	23.8
No Training	214	76.2
Contract Writing		
Has Had Training	100	35.6
No Training	181	64.4
Weighted Guidelines		
Has Had Training	99	35.2
No Training	182	64.8
Internet		
Has Had Training	103	36.7
No Training	178	63.3

independent variable. In order to determine if computer anxiety or computer self-efficacy interacted with the amount of time spent on the computer, these two items were included as covariates. If the p-value of the main effect of training or job position was less than or equal to .05, then it could be said with 95% confidence that the time spent using computers differed between the groups. By using computer anxiety and self efficacy as covariates, their interaction with the time spent using computers could be determined and factored out of the ANOVA. This would clarify the relationship between the dependent variable and the two independent variables, controlling for a possible source of bias.

IV. Results

Introduction

The amount of time each respondent spent on each of the eight programs or tasks was analyzed for respondents in the four job categories of supervisor, Procurement Contracting Officer (PCO) , contract negotiator, and staff [see Table 3]. The results seemed consistent with job requirements; contract negotiators generally develop

Table 3. Time Spent on Computer Programs and Tasks

	Supervisors	PCOs	Buyers	Staffers
Word Processors	1.14	2.00	2.25	1.72
Spreadsheets	0.34	0.57	1.08	0.66
Slide Presentation	0.27	0.26	0.20	0.54
Email	1.41	1.58	1.08	1.22
Databases	0.08	0.00	0.07	0.24
Contract Writing	0.01	0.42	0.53	0.39
Weighted Guidelines	0.02	0.19	0.27	0.06
Internet	0.53	0.74	0.47	0.99

Average hours per day using computer resources.

negotiation positions using spreadsheet programs, and the results showed that they were more frequent users of spreadsheets than PCOs and supervisors.

This data was next analyzed by examining the populations that had training on a given application or task versus those who did not [see Figure 1]. Also of interest, were the differences across job categories. Finally, there was a possibility that computer anxiety and self-efficacy could have an influence on the amount of time spent, so it was necessary to isolate their effects to determine if the effects of training and job category were significant. Separate ANOVAs for each category of computer software or computer task were used to accomplish this, using time spent on each software package or computer task as the dependent variable, level of training and job category as independent variables, and computer anxiety and self-efficacy as covariates.

ANOVA

First, the amount of time each respondent spent on a given software package or computer task was analyzed using an ANOVA against level of training and job category. Then, since there was reason to believe that computer anxiety and computer self-efficacy affect the amount of time people spend using computers, they were included in the ANOVA as covariates. By factoring out the effects of these two variables, the relationship between training and time spent using computers could be more accurately interpreted.

Overall, the amount of time spent using the computer was significantly different for both job function and training level. Figure 2 shows, for each ANOVA, which relationships were significant. The first and fourth columns show the relationships that were significant at the alpha = 0.05 level for both training and job category. The second and fifth columns show the relationships that were significant for computer anxiety, and

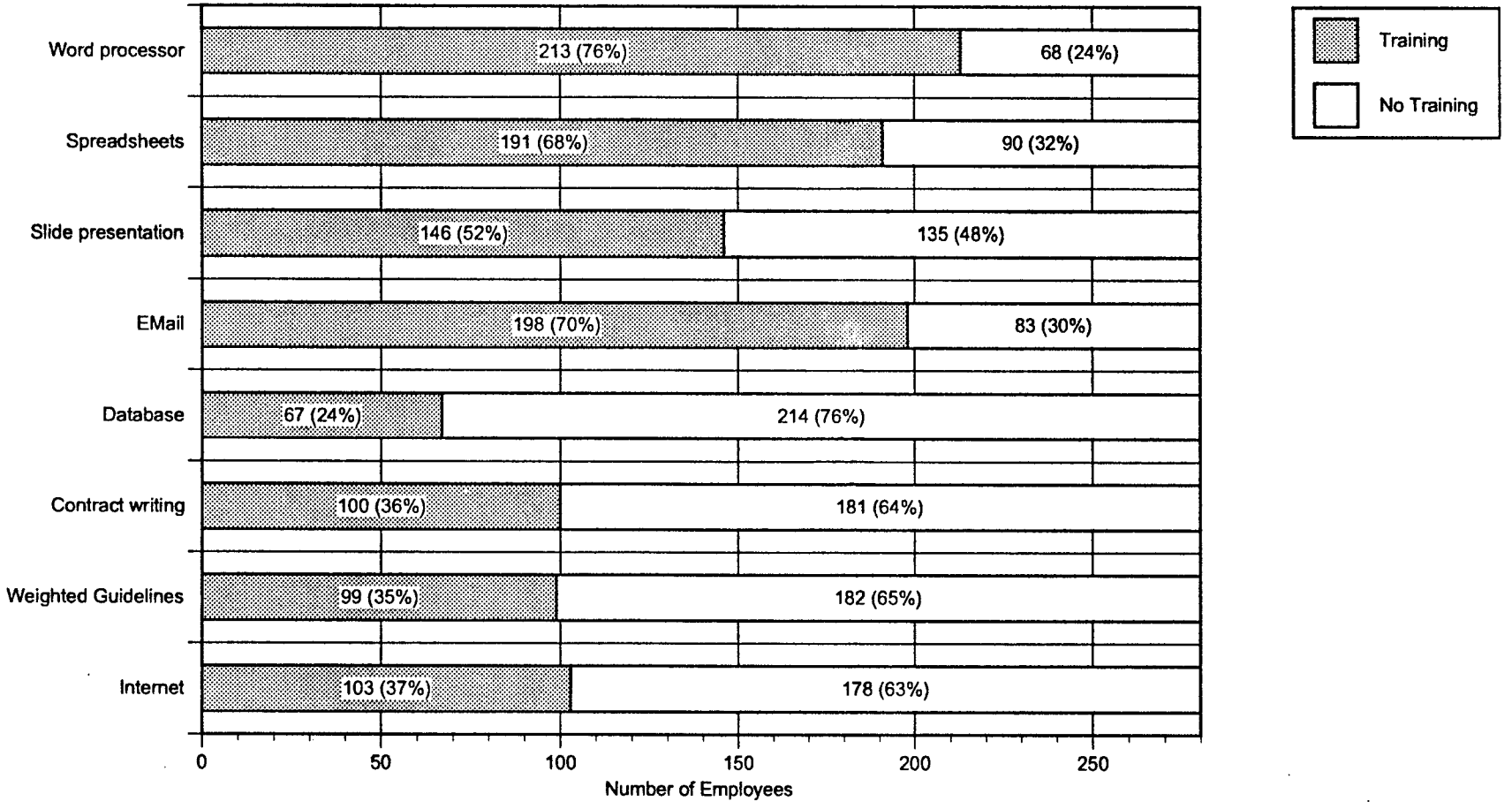

Figure 1. Percentage of Subjects Receiving Training by Software Package or Task

columns three and six show computer self-efficacy. This figure shows the significance of the relationship between software package or task and time spent using the computer for both training and job category.

Figure 3 shows the average amount of time employees spent on each software package or task, reported by job category. Further, the average amount of time individuals in each job category spent on each software package or task is reported in relation to whether or not there was training. In most cases employees who had training spent more time using the computer, except for PCOs using email and the internet, in which case there was not a significant difference in time spent using computers and training.

Computer anxiety and computer self-efficacy were significant covariates of time spent using computers in most cases; by taking into account the computer anxiety and self-efficacy, a percentage of variation in time spent using computers was explained. Figure 4 shows the percentage of explained variance that was attributable to either computer anxiety or self-efficacy. In this figure, each pie chart represents the total

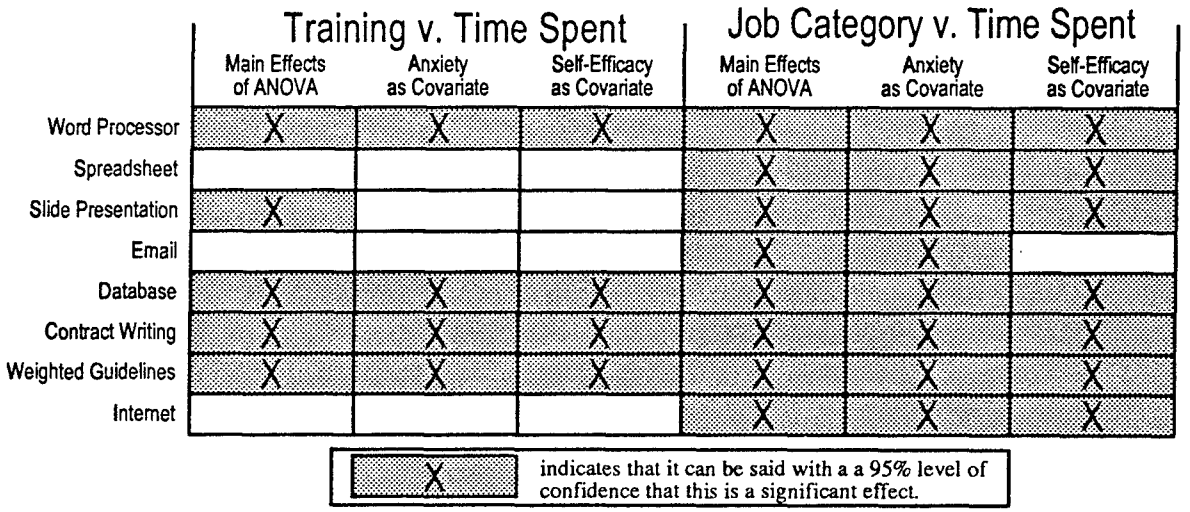

Figure 2. Significance of ANOVA at the alpha = 0.05 level

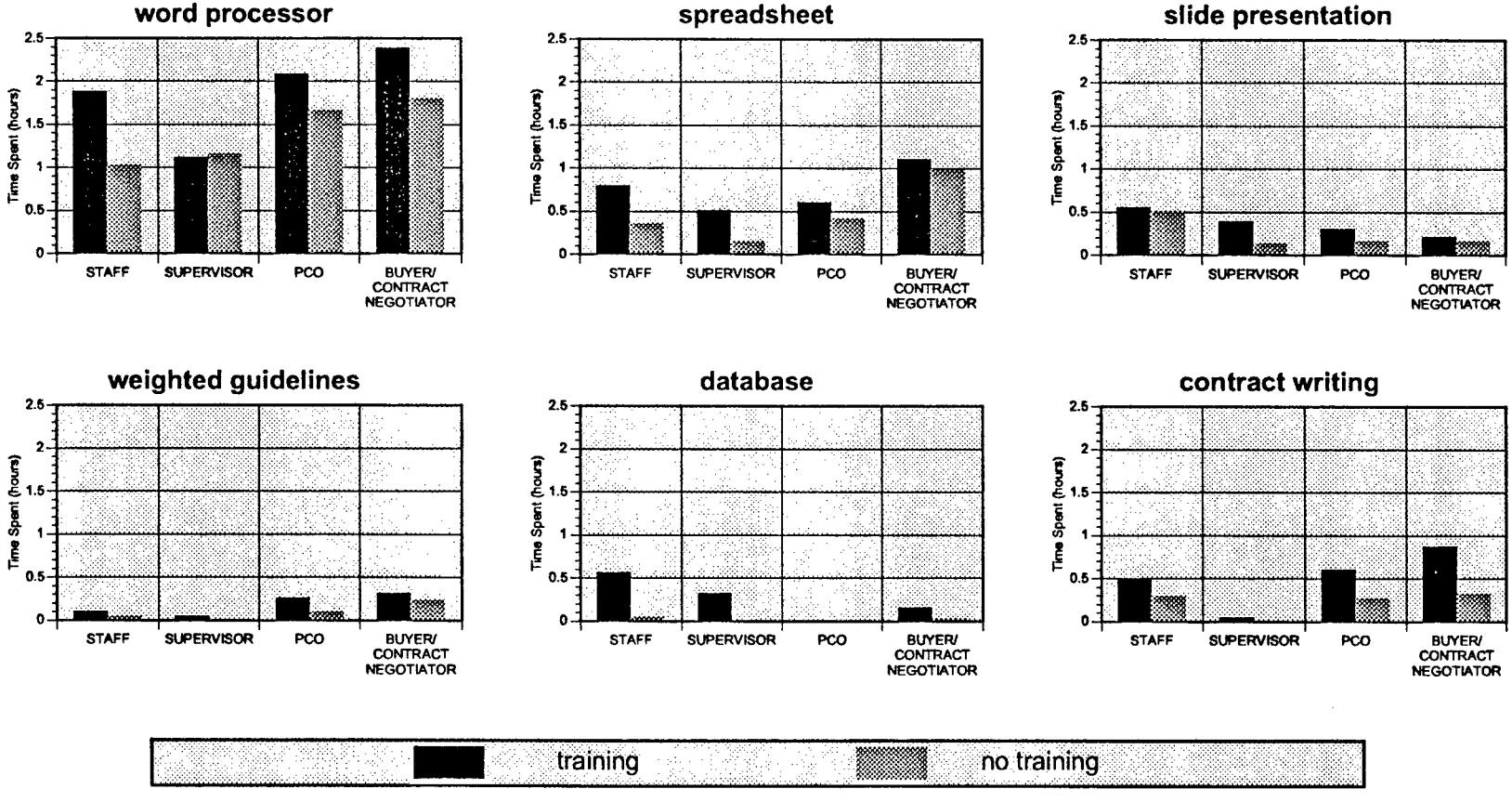

Figure 3. Time Spent Using Computer Programs by Training Category

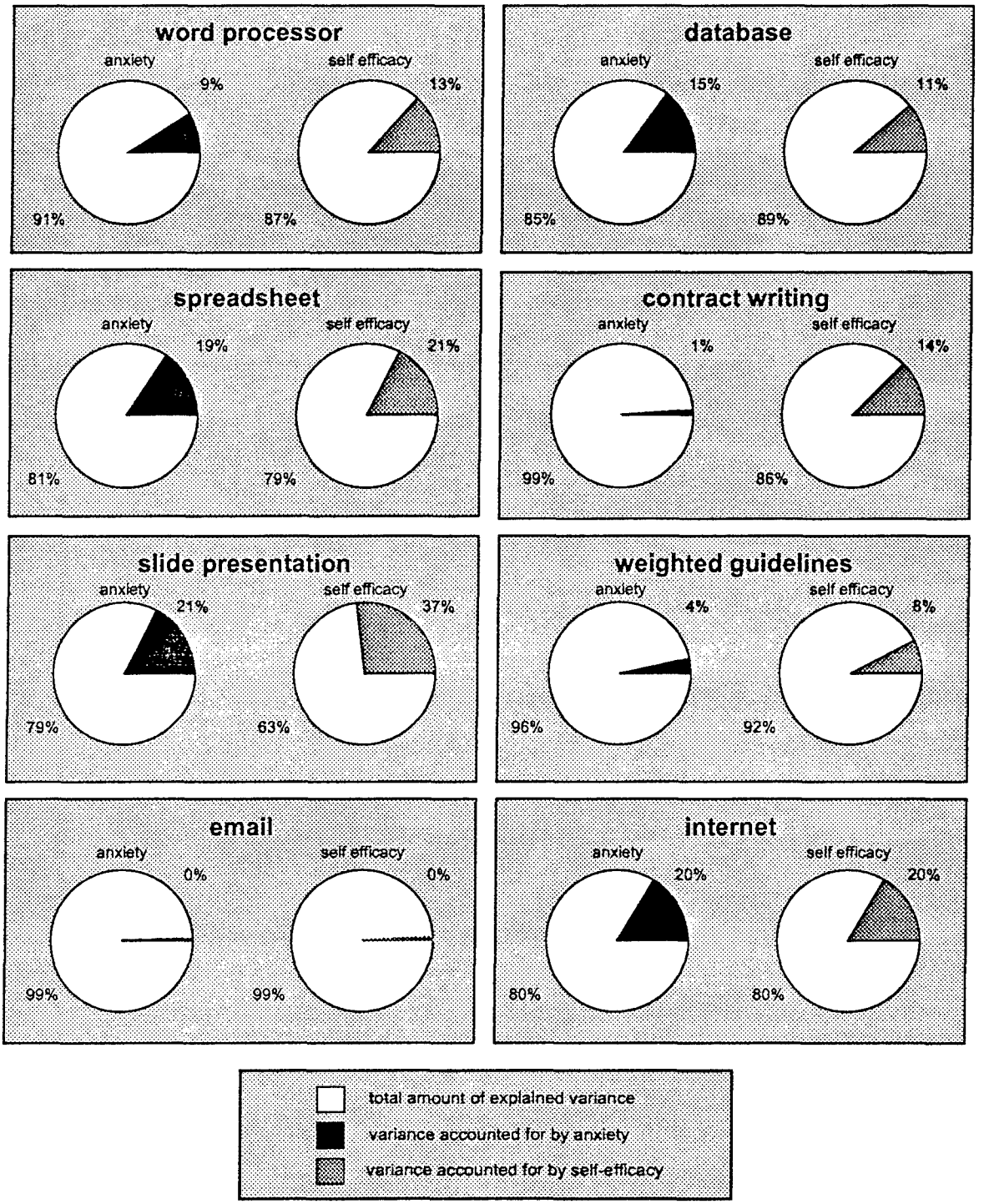

Figure 4. Percentage of Total Explained Variance Accounted for by the Covariates *Computer Anxiety* and *Computer Self-Efficacy* in separate ANOVAs

amount of variance that could be explained using an ANOVA. For each ANOVA, the amount of variance that was attributable to computer anxiety and computer self-efficacy is shown. After removing the effects of computer anxiety and computer self-efficacy, the main effects of training and job category on time spent using computers was still significant in most cases.

Results

Results of the analysis of variance between time spent and training on word processors, slide-presentation programs, database programs, automated contract-writing programs, and weighted guidelines programs showed that there were significant differences between the trained and untrained groups. There were also significant differences in time spent by personnel in different job categories. Computer anxiety and self-efficacy were included as covariates, and were shown to be significant; nevertheless, the main effects of training and job category remained significant after controlling for these covariates. Thus, after removing the effects of computer anxiety and self-efficacy from the relationship of time spent on computers to training level and job category, there was still a significant difference in time spent. This means that despite computer anxiety and computer self-efficacy, the amount of time an employee spent using these software applications was related to job function and level of training.

This study did not provide enough evidence to conclude that level of training was related to time spent using spreadsheet, email, or internet programs, but significant differences were evident in the amount of time spent on each function by job category. Computer anxiety and self-efficacy explained a large percentage of variance in use of spreadsheet and internet software; after factoring out these variables, a significant

difference in time spent remained that could be attributed to job category. Thus, time spent using spreadsheet and internet software related to the job function of an employee, but this study could not say to what extent training related to the amount of time spent. Computer anxiety and self-efficacy did not explain significant variance in the amount of time spent using email.

Training was significantly related to use of slide-presentation programs; however, once controlling for computer anxiety and self-efficacy, the difference was no longer significant. Time spent on slide-presentation programs remained significantly different by job category, after computer anxiety and self-efficacy were taken into account. This means that there was not sufficient evidence to show that training alone was related to the amount of time spent using slide-presentation software. However, there was sufficient evidence to show that job category alone was related to time spent.

V. Discussion

This study examined the way Air Force contracting personnel use their computers. It examined the relationship between the amount of time that employees use computer software and the amount of training they received in each software package. The results showed that as training increased, so did the amount of time that people used their computers even when differences in self-efficacy and anxiety were included in the analysis. This indicated that either the amount of time spent on computers is affected by the level of training that employees have received, or the amount of time an employee spends on a computer affects the amount of training taken.

The most straightforward interpretation is that, if managers want to increase use of computers in the workplace, they should provide more training to their employees.

For word processors, database programs, contract-writing programs and weighted guidelines programs, there was a significant relationship between the amount of time spent using computers and training, even after controlling for computer anxiety and computer self-efficacy. This suggests that managers should increase the amount of training that employees receive on these applications. Spreadsheet, email, and internet programs did not show a difference in time spent for differing training levels, but differences were evident across job categories. Slide-presentation programs initially showed a significant difference in time spent and training, but after taking computer anxiety and self-efficacy into account, the difference was no longer significant. This

suggests that computer anxiety and self-efficacy are major factors in whether an employee uses a slide-presentation program.

Management Implications

Based on the numbers of employees who have not taken training [see table 4] , it is evident training dollars should be focused in certain areas. Applications that are written in-house or written specifically for contracting by professionals, such as contract-writing programs, are not represented very well in training. Of 281 employees who completed the survey, only 100 had been trained to use contract-writing programs. Only 99 out of 281 employees indicated that they had been trained on weighted guidelines applications. This could be because either it is easier to contract out training for major commercial applications to local training firms, or that resources do not exist to train homegrown applications in the same way.

Computer anxiety and self-efficacy explained a significant portion of the variation in the amount of time spent using computers. Steps should be taken to reduce computer anxiety and increase computer self-efficacy. Computer anxiety can hamper performance when skill levels are low (Szajna, 1994). Research has shown that creating a learning environment where trainees believe that they can build on present abilities will result in lowered anxiety (Martocchio, 1994). Computer self-efficacy also needs to be addressed. Delivering knowledge without considering the self-efficacy of the trainee can hamper learning (Gist, 1987). Structuring classes that allow people to proceed at a their own pace should help. Older employees may have special needs when training in technology, because research has shown that younger employees learn computer skills better (Gist, Rosen & Schwoerer, 1988). If older, or more anxious people need to learn at a different pace, then separate classes should be given, with each section tailored to a

given age group or anxiety level. Once employees learn that computer classes suited to their perceived ability level are available, they might be more apt to attend training (Bandura, 1986).

This study, in whole, showed that there is reason to believe that increased levels of training among Air Force contracting personnel would be associated with increased usage of computers. In most cases, employees that received more training used the computer more often. If the increased computer usage is a goal of Air Force contracting management, focus should be placed on training.

Appendix: Survey Instrument

INFORMATION ABOUT THIS RESEARCH STUDY

Thank you for agreeing to participate in this research project. Your participation in this anonymous survey is strictly VOLUNTARY. Your work experience can make an important contribution to the goals of this research project.

Description of the study: The goal of this study is to learn how different types of computer-related performance contribute to the organization.

How your responses will be used: The information you provide will help to explain which attitudes and abilities relating to computers are most valuable to the Air Force. It will help the Air Force understand how use of computers contribute to the mission, and may help the Air Force to better understand the cost\benefits associated with computer training. This research will not affect anyone presently in your organization in any way.

Confidentiality of your responses: This information is being collected for research purposes only. No one in your unit, base, or MAJCOM will EVER be allowed to see your responses. You are welcome to discuss this questionnaire with anyone you choose.

PRIVACY ACT STATEMENT

In accordance with AFR 12-35, Paragraph 8, the following information is provided as required by the Privacy Act of 1974.

Authority: 10 U.S.C. 8012, Secretary of the Air Force; powers and duties; delegation by; implemented by AFR 30-23, Air Force Personnel Survey Program.

Purpose: To obtain information regarding the influence of different aspects of computer-related work performance on the overall value of Air Force personnel.

Routine Use: To increase understanding of various types of computer-related work performance. Data will be grouped prior to analysis. No analysis of individual responses will be conducted and only members of the research team will be permitted access to the raw data. Reports summarizing trends in large groups of people may be published.

Participation: Participation is VOLUNTARY. No adverse action will be taken against any member who does not participate in this survey or who does not complete any part of the survey.

Please respond to the following questions in the blocks provided. If there are activities listed that you do not do every day, list an amount of time that would be average:

On the average, how much time do <u>you</u> spend on each activity below?	Each Day hours	Each Day minutes
Using a word processor (such as Word or Word Perfect)		
Using a spreadsheet (such as Excel or Lotus 1-2-3)		
Using a chart, graph or slide program (such as PowerPoint or Harvard Graphics)		
Using a database program (such as Access or d-Base IV)		
Using other commercial off-the-shelf software		
Using an automated weighted guidelines program		
Using an automated contract writing program		
Using other programs tailored to USAF acquisition/contracting requirements		
Using general purpose USAF, AFMC or ASC programs (such as personnel programs)		
Reading email messages		
Writing or answering email messages		
Using DoD or USAF homepages		
Using other internet resources		
Downloading or uploading information		
Reading computer-related books or instructional materials		
Writing, testing or designing programs for your own use, or for others to use		
Developing macros or templates for yourself or others to use		
Teaching others how to use computers		
Helping others overcome day-to-day computer problems		

These surveys are anonymous. Please do not write your name on the survey. Please enter requested information on the enclosed **PURPLE DATA COLLECTION FORM** using only a #2 pencil.

- Please enter your **THREE LETTER** office symbol on the PURPLE DATA COLLECTION FORM in the space marked LAST NAME. For example ASC/PKXM would enter "ASCPKX" and WL/MLKN would enter "WLMLK." Please fill in the bubbles with a pencil.

- Please enter your date of birth in the area below LAST NAME where it says BIRTHDATE.

- Please enter your SEX in the provided block, "B" means Male, "G" means Female

Please answer the following questions on the **PURPLE DATA COLLECTION FORM** starting with number 1.

1. Please enter

1. If you are civilian or
2. If you are military

2. Please enter your grade/rank:

1. GS 7-9-11 or O-1 through O-2
2. GS 12 or O-3
3. GS 13 or O-4
4. GS 14 or O-5
5. GS 15 or O-6

3. What is your job function:

1. Buyer/Contract Negotiator
2. PCO
3. Supervisor
4. I don't fit into one of the above categories

4. How many years have you been using a computer?

1. More than 15 years
2. 10 - 14 years
3. 5 - 9 years
4. 1 - 4 years
5. Less than 1 year

5. How long have you been working in contracting?

1. Less than 1 year
2. 1 year to 5 years
3. 6 years to 10 years
4. 11 years to 20 years
5. 21 years or longer

COMPUTER ATTITUDES AND USE

Please answer the following questions on the **purple data collection sheet**, using a #2 pencil. Use the following scale:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

6. I hesitate to use a computer for fear of making mistakes that I cannot correct.
7. I feel insecure about my ability to interpret a computer printout.
8. I have avoided computers because they are unfamiliar and somewhat intimidating to me.
9. I have difficulty in understanding the technical aspects of computers.
10. The challenge of learning about computers is exciting.
11. I look forward to using a computer on my job.
12. Anyone can learn to use a computer if they are patient and motivated.
13. I am productive in my use of computers.
14. I am more efficient with computers than without computers.
15. I have received the training required to operate my computer effectively.
16. I know how to use the computer programs necessary to complete my mission.

COMPUTER TRAINING

Please answer the following questions on the **purple data collection sheet**, using a #2 pencil. Use the following scale:

Never Received Any Training	Very Low Quality	Moderate Quality	High Quality	Very High Quality
1	2	3	4	5

Please rate the quality of the formal computer classes or training you received in the following areas...

17. Use of a word processor, like Microsoft Word.

18. Use of a spreadsheet, like Microsoft Excel.

19. Use of a slide presentation program like Microsoft Power Point.

20. Use of an E-Mail program.

21. Use of a database, such as Foxbase, d-base, Access or AMIS

22. Use of Automated Contract Writing Programs.

23. Use of Automated Weighted Guidelines

24. Use of the World Wide Web and Internet programs, like Netscape or Mosaic.

COMPUTER CONFIDENCE

Please answer the following questions on the **purple data collection sheet**, using a #2 pencil. Use the following scale:

None at All	A Small Amount	A Moderate Amount	A Large Amount	An Extremely Large Amount
1	2	3	4	5

How much confidence do you have in your ability to...

25. call up a data file to view on the monitor screen?

26. use the computer to write a letter?

27. enter and save data (numbers or words) into a file?

28. move the cursor around the monitor screen?

29. make selections from an on-screen menu?

30. escape/exit from a program or software?

31. do your work on a personal computer (microcomputer)?

32. use a printer to make a "hardcopy" of my work?

33. store software correctly?

34. handle a floppy disk correctly?

35. understand terms/words relating to computer software?

36. understand terms/words relating to computer hardware?

37. learn to use a variety of programs (software)?

Please answer the following questions on the **purple data collection sheet**, using a #2 pencil. Use the following scale:

None at All	A Small Amount	A Moderate Amount	A Large Amount	An Extremely Large Amount
1	2	3	4	5

How much confidence do you have in your ability to...

38. understand the three stages of data processing: input, processing and output?
39. describe the function of computer hardware (keyboard, monitor, disk drives, computer processing unit?
40. use the computer to organize information?
41. troubleshoot computer problems?
42. get help for problems in the computer system?
43. use the user's guide when help is needed?
44. write simple programs for the computer?
45. copy a disk?
46. get rid of files when they are no longer needed?
47. organize and manage data files?
48. add and delete information from a data file?
49. copy an individual file?
50. get software up and running?

Please answer the following questions on the **purple data collection sheet**, using a #2 pencil. Use the following scale:

None at All	A Small Amount	A Moderate Amount	A Large Amount	An Extremely Large Amount
1	2	3	4	5

How much confidence do you have in your ability to...

51. explain why a program (software) will or will not run on a given computer?

52. show someone else how to use a computer?

53. transfer information between two programs like Microsoft Excel and Word?

54. download information from a computer?

55. use the World Wide Web?

56. send someone an email attachment?

57. use a gopher program?

Thank you for completing this survey. Please hand this completed survey to your point-of-contact so that it may be returned to:

1st Lt John Van Huffel
AFIT/LAA
2950 P Street
Wright-Patterson AFB OH 45433-7765

if you have any questions, please call
(513) 256-9688
or email JVanHuff@afit.af.mil or
van@dnaco.net

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Vita

First Lieutenant John Van Huffel [redacted]. He graduated from Lakewood High School in 1988 and went on to Kent State University as a Photo-Journalism major, but left with a degree in Business Management and Finance. He spent five years working for the Daily Kent Stater, where he sold advertising, wrote editorials, and served as Graphics Editor. He graduated from Kent in 1993 with an ROTC commission in the Air Force. He married Deborah Burns in A[redacted], and was assigned to the Wright Laboratory, Wright-Patterson AFB, OH two weeks later. Lt Van Huffel was a contract negotiator for the Materials Directorate of the Wright Laboratories until he entered the Contracting Management program at the Air Force Institute of Technology in May of 1995. After graduation he will be sent to Los Angeles AFB, CA where he will serve as a contract negotiator for the Space and Missile Systems Center.

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13. ABSTRACT (*Maximum 200 Words*)

We know little about how Air Force personnel use the computer resources with which they have been provided, though current plans call for spending over $75M on computer resources throughout the Air Force in FY 97. Research suggests that computer use relates to computer training, computer anxiety, and computer self-efficacy. Managers can take action to ensure that computers are better utilized with knowledge of how computer resources are being used, and an understanding of the effect that training, computer anxiety, and computer self-efficacy have on that usage. This study examines the use of computers by contracting personnel in the Air Force's Aeronautical Systems Center Contracting Directorate. Its purpose was to discover the amount of time employees spent using different computer programs and completing various computer tasks, and to measure their training level for each program or task . It also measured data about employees' computer anxiety and computer self-efficacy. Training was found in most instances to be related to increased computer usage, and employees in different job functions were also found to use computers to differing extents. Computer anxiety and self-efficacy were found to be related to the amount of time employees spent using computers. Time spent using computers and training amount were still significantly related, even when the effects of computer anxiety and self-efficacy were factored out of the equation.

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AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. **Please return completed questionnaire** to: AIR FORCE INSTITUTE OF TECHNOLOGY/LAC, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765. Your response is **important.** Thank you.

1. Did this research contribute to a current research project? a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?
a. Yes b. No

3. **Please estimate** what this research would have cost in terms of manpower and dollars if it had been accomplished under contract or if it had been done in-house.

Man Years_____ $_____

4. Whether or not you were able to establish an equivalent value for this research (in Question 3), what is your estimate of its significance?

a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments (Please feel free to use a separate sheet for more detailed answers and include it with this form):

_____ _____
Name and Grade Organization

_____ _____
Position or Title Address